

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see Amendment, filed 7/9/08, with respect to the rejection(s) of claim(s) 1-29, 31-40, and 42-43 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 1-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 1, 7, 14, and 25 recite matching and sampling step, wherein the sampling step is performed after the matching step. However, the original disclosure discloses that the sampling is done at the output of the amplifier 610 (Fig. 6a) (pub [0044]). This means that the sampling step is performed prior to the matching step. There's no teaching in the specification that the sampling is performed after the matching filers. Therefore claim 7 lacks of enablement to one of ordinary skill in the art.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim(s) 1-28 is/are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory “process” under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing (Reference the May 15, 2008 memorandum issued by Deputy Commissioner for Patent Examining Policy, John J. Love, titled “Clarification of ‘Processes’ under 35 U.S.C. 101”). The instant claims neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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6. Claims 1-6, 8, 14-19, and 25 are rejected under 35 U.S.C. 102(e) as being unpatentable by Richards et al. (US 2002/0075972).

a) Regarding claim 1, Richards et al disclose a method for sampling a signal (received signal 1006 in Fig. 10) comprising:

matching the signal to a first receive pulse shape (1008 in Fig. 10; [0192,0193]);

matching the signal to a second receive pulse shape (1026 in Fig. 10; [0194]);

sampling outputs from the first and second matching (1012 and 1034 in Fig. 10);

and

creating an output signal (1046 in Fig. 10) from combining the sampled outputs (1020 and 1040 in Fig. 10 are accumulators of the digital signals 1014 and 1036, respectively; [0200]).

b) Regarding claims 2 and 15, Richards et al. disclose wherein the first and the second receive pulse shapes are essentially equal, and wherein the first receive pulse shape has been advanced a first time offset and the second received pulse shape has been retarded a second time offset (pulse 1074 is delayed with 0.125nsec and correlate with the received signal in the first correlator (1076 in Fig. 10); pulse 1074 is delayed with 5.0nsec and correlate with the received signal in the second correlator (1080 in Fig. 10); see [0197]).

c) Regarding claims 3 and 16, Richards et al. disclose wherein the first time offset and the second time offset are essentially equal (pulse 1104a in Fig. 11A is advanced and pulse 1112b is retarded, wherein, it is clearly interpreted that the offset for the two pulses is the same, i.e., 5.0nsec).

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d) Regarding claim 4, Richards et al. disclose wherein the first and the second time offsets can be determined from characteristics of the signal ([0171], lines 1-7, wherein, the correlation function is interpreted as the characteristics of the signal).

e) Regarding claim 5, Richards et al. disclose wherein the first and the second time offsets can be determined adaptively ([0176], lines 9-11, wherein, 'based on information modulation' is interpreted to be equivalent to adaptively).

f) Regarding claim 6, Richards et al. disclose wherein the sampling occurs at the same time for each output (1012 and 1034 in Fig. 10).

g) Regarding claim 8, Richards et al disclose wherein the creating comprises adding the sampled outputs together (1020 and 1040 in Fig. 10).

h) Regarding to claim 14, Richards et al disclose a method for reducing sensitivity to sample timing errors comprising:

matching a received signal (received signal 1006 in Fig. 10) to a first received pulse shape, wherein the first received pulse shape is a representation of a pulse carried in the received signal (1008 in Fig. 10; [0192,0193]);

matching the received signal to a second receive pulse shape, wherein the second received pulse shape is a representation of the pulse carried in the received signal (1026 in Fig. 10; [0194]);

sampling outputs from the first and second matching (1012 and 1034 in Fig. 10);
and

combining the sampled (1020 and 1040 in Fig. 10 are accumulators of the digital signals 1014 and 1036, respectively; [0200]) to create an output signal (1046 in Fig. 10).

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i) Regarding claim 17, Richards et al. disclose wherein the first and the second time offsets can be chosen based upon an auto-correlation function of the pulse ([0171], lines 1-7, wherein, the 'correlation function' is clearly equivalent the auto-correlation function).

j) Regarding claim 18, Richards et al. disclose wherein the first and the second time offsets can be chosen adaptively ([0176], lines 9-11, wherein, 'based on information modulation' is interpreted to be equivalent to adaptively).

k) Regarding claim 19, Richards et al. disclose wherein in an additive white Gaussian noise situation, the outputs can be combined by addition ([0167], lines 5-7 and [0215], lines 13-15, wherein, 'optimize signal to noise ratio' is interpreted to include encompassing optimization when white Gaussian noise is present, as such noise is what is referred to when noise is generally referenced).

l) Regarding to claim 25, Richards et al disclose a method for reducing sensitivity to sample timing errors comprising:

matching a received signal (received signal 1006 in Fig. 10) to a first received pulse shape, wherein the first received pulse shape is a representation of a pulse carried in the received signal (1008 in Fig. 10; [0192,0193]);

matching the received signal to a second receive pulse shape, wherein the second received pulse shape is a representation of the pulse carried in the received signal (1026 in Fig. 10; [0194]);

sampling outputs from the first and second matching (1012 and 1034 in Fig. 10);
and

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combining the samples (1020 and 1040 in Fig. 10 are accumulators of the digital signals 1014 and 1036, respectively; [0200]) to create an output signal (1046 in Fig. 10); and

adjusting sample timing (1048, 1049, 1050, 1052, 1054, and 1056 in Fig. 10; [0221],[0225]).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wright et al (US 5,309,482).

a) Regarding claim 7, Wright et al disclose a method for sampling a signal (signal received at antenna 32 in Fig. 1) comprising:

matching the signal to a first receive pulse shape (matching filter 50);

matching the signal to a second receive pulse shape (matching filter 50);

sampling at the same time, and at a sampling rate that can be determined from expected characteristics of the signal, outputs from the first and second matching (1012 and 1034 in Fig. 10; [0171], lines 1-7, wherein, the correlation function is interpreted as the characteristics of the signal); and

creating an output signal from the sample outputs, the output signal including components of both sampled outputs (54; Col 2, L20-25).

Wright et al disclose a sampling at a sampling rate that can be determined from expected characteristics of the signal (A/D 46 and 48), except for the location of the A/D circuitry. The A/D sampling is performed prior to the matched filtering. However, an A/D converter is a well known and essential component in a receiver system. To apply an A/D converter before or after the matched filter will not change or alter the result in the receiver. In both situations, the signal produced at the output is digitally matched filtered signal. Therefore, it is obvious to one of ordinary skill in the art to implement the A/D converter after the matched filter. By doing so, produce digital matched filtered signal output.

9. Claims 9-12, 20, 21, 23, 24, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richards et al. (US 2002/0075972) in view of Applicant Admitted Prior Art (AAPA).

a) Regarding claims 9-12, 20, 21, 23 and 24, Richards et al. disclose all the subject matters above except for the specific teaching of multiply each sample with a weighting factor prior to the adding. However, AAPA disclose a conventional receiver system using pulse-matched filter (305 in Fig. 3). The output from the pulse-matched filter is equalized by a channel equalizer (335) prior to decoding ([0038]). There are different types of equalizer, including decision feedback (DFE) or maximum-likelihood sequence estimator (MLSE). It is well known that an equalizer comprises a plurality of weighting

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factors in a tapped-delay line fashion to minimize intersymbol interference. The weighting factors can be adaptive or non-adaptive. Therefore, it is obvious to one of ordinary skill in the art to implement the channel equalizer teaching of AAPA with the receiver system of Richards et al. By doing so, reduce the effects of any multipath interferences.

b) Regarding claim 26, Richards et al. disclose the adjusting comprises comparing early, on-time, and late sampling of a sample ([0221]). Richards is silent about setting the sample timing to the sampling of a largest value. However, AAPA disclose that a common prior technique for adjusting sample timing is to compare samples and sample timing is adjusted to maximize received signal strength. Therefore, it is obvious to one of ordinary skill in art to adjust the sample timing of Richards et al. to the largest value of sample to maximize signal strength.

10. Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richards et al. (US 2002/0075972) in view of Ariyoshi et al (US 6,049,536).

Regarding claims 27 and 28, Richards et al disclose all the subject matters above except for a despreaders in the receiver.

However, Ariyoshi et al disclose a CDMA receiver comprises a despreaders (603,604 in Fig. 5) having inputs coupled to a first and a second matched filter (601 in Fig. 5). The output of the matched filter derives as a correlation value and enables despread processing for fast acquisition (Col 8, L41-43). Applicant's invention is used in ultra-wideband communication system (UWB) (title; [0004]). Applicant also states

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that the despreader is maybe needed for communication system such as CDMA ([0047, L9-14]). Since applicant did not specifically described UWB to CDMA system conversion, it is assumed such conversion is well known and easy to achieve.

Therefore, it is obvious to one of ordinary skill in art to implement the despreading process taught by Ariyoshi et al at the output of the first and second matched filters of Richards et al. Since Richards et al's sample timing recovery system has a feedback loop structure, the despreading occurs prior to adjusting sample timing and after the adjusting. Combine the teaching of Ariyoshi et al and Richards et al to achieve faster acquisition in a communication receiver system.

11. Claims 29 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zangi et al (US 6,778,619).

a) Regarding to claim 29, Zangi et al disclose a circuit (Fig. 7) comprising:

a first matched filter coupled to a signal input ($r1(n)$), the first matched filter containing circuitry to compare a pulse provided by the signal input to a first receive pulse shape and to provide an output sample based upon the comparison (51);

a second matched filter coupled to a signal input ($r2(n)$), the second matched filter containing circuitry to compare a pulse provided by the signal input to a second receive pulse shape and to provide an output sample based upon the comparison (51);

an equalizer coupled to the first and the second matched filters to produce an output signal (57; Col 2, L 31-40).

Zangi et al did not explicitly teach a circuitry to combine samples in the equalizer. However, Zangi et al disclose a combiner coupled at the output of the matched filter and

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produce a combined output signal $Z1(n)$. The combined output signal is coupled to the equalizer (57). To implement a combiner prior to the equalization processor will not change the receiver result so long as the output is the equalized combined signal.

Therefore, it would have been obvious to one of ordinary skill in the art to realize Zangi et al's system and the instant application are functionally equivalent. They produce the same result.

b) Regarding claim 35, Zangi et al. disclose wherein the first received pulse shape is advanced version of the pulse ($r2[n]$ in Fig. 7) and the second receive pulse shape is a retarded version of the pulse (47,49, and $r1[n]$).

12. Claims 31-34 and 36-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zangi et al (US 6,778,619) in view of Applicant Admitted Prior Art (AAPA).

a) Regarding claim 31, Zangi et al disclose all the subject matters above except for specific teaching of the matched filter. However, AAPA discloses a matched filter comprises:

- a multiplier to multiply the pulse with a receive pulse shape (320 in Fig. 3);

- an integrator coupled to the multiplier, the integrator to accumulate a value from an output produced by the multiplier (325 in Fig. 3); and

- a sampler coupled to, the integrator, the sampler to periodically create a sample based upon the accumulated value from the integrator (330 in Fig. 3; [0038]).

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Therefore, it is obvious to one of ordinary skill in the art to combine the matched filter teaching of AAPA with Zangi et al. By doing so, facilitate matched filtering process and pulse detection in a wireless receiver system.

b) Regarding claim 32, AAPA disclose wherein the sampler is a switch that periodically closes to produce a sample (330 in Fig. 3; [0038]).

c) Regarding claim 33, Zangi et al disclose a circuit (Fig. 7 comprising:

a first matched filter coupled to a signal input ($r_1(n)$), the first matched filter containing circuitry to compare a pulse provided by the signal input to a first receive pulse shape and to provide an output sample based upon the comparison (51);

a second matched filter coupled to a signal input ($r_2(n)$), the second matched filter containing circuitry to compare a pulse provided by the signal input to a second receive pulse shape and to provide an output sample based upon the comparison (51);

an equalizer coupled to the first and the second matched filters to produce an output signal (57; Col 2, L 31-40).

Zangi et al did not explicitly teach a circuitry to combine samples in the equalizer. However, Zangi et al disclose a combiner coupled at the output of the matched filter and produce a combined output signal $Z_1(n)$. The combined output signal is coupled to the equalizer (57). To implement a combiner prior to the equalization processor will not change the receiver result so long as the output is the equalized combined signal. Therefore, it would have been obvious to one of ordinary skill in the art to realize Zangi et al's system and the instant application are functionally equivalent. They produce the same result.

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Zangi also did not explicitly disclose the teaching of the matched filter. However, AAPA discloses a matched filter comprises:

- a multiplier to multiply the pulse with a receive pulse shape (320 in Fig. 3);

- an integrator coupled to the multiplier, the integrator to accumulate a value from an output produced by the multiplier (325 in Fig. 3); and

- a sampler coupled to, the integrator, the sampler to periodically create a sample based upon the accumulated value from the integrator (330 in Fig. 3; [0038]).

Therefore, it is obvious to one of ordinary skill in the art to combine the matched filter teaching of AAPA with Zangi et al. By doing so, facilitate matched filtering process and pulse detection in a wireless receiver system.

d) Regarding claim 34, AAPA disclose wherein the period is further based upon a data rate of information carried in the pulse provided by the signal input ([0038]).

e) Regarding claim 36, Zangi et al disclose a receiver (Fig. 7) comprising:

- a first matched filter coupled to a signal input ($r1(n)$), the first matched filter containing circuitry to compare a pulse provided by the signal input to a first receive pulse shape and to provide an output sample based upon the comparison (51);

- a second matched filter coupled to a signal input ($r2(n)$), the second matched filter containing circuitry to compare a pulse provided by the signal input to a second receive pulse shape and to provide an output sample based upon the comparison (51); and

- an equalizer coupled to the first and the second matched filters to produce an output signal (57; Col 2, L 31-40).

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Zangi et al disclose all the subject matters above except for the specific teaching of a band select filter, an amplifier, and a decoder. However, AAPA disclose a conventional receiver system comprises a band filter (310), an amplifier (315), pulse-matched filter (305), a channel equalizer (335), and a channel decoder (340 in Fig. 3). The band select filter eliminates signals that are outside of a particular band of interest. The amplifier brings an output of the band select filter to a desired level ([0037]). The output of matching filter can be equalized by a channel equalizer to undo the effects of any multipath and then passed to a channel decoder for error detection ([0038]). Therefore, it is obvious to one of ordinary skill in the art to combine the band select filter, the amplifier, and the decoder as taught by AAPA with the receiver system of Zangi et al. By doing so, provide a better sample timing control receiver in a wireless communication system.

j) Regarding claim 37, Zangi et al. disclose wherein the receiver operates in a wireless communications network (Col 1, L9-19).

k) Regarding claim 38, Zangi et al. disclose wherein the wireless communication network is an ultra-wideband communication network (it is obvious to one of ordinary skill in the art to operate Zangi et al's CDMA communication system in ultra wideband frequency, by doing so increase bandwidth and higher frequency diversity).

l) Regarding claim 39, Zangi et al. disclose wherein the wireless communication network is a carrier-less ultra-wideband communication network (it is obvious to one of ordinary skill in the art to operate Zangi et al's CDMA communication system in ultra wideband frequency, by doing so increase bandwidth and higher frequency diversity).

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m) Regarding claim 40, Zangi et al. disclose wherein the wireless communication network is a wavelet-based ultra-wideband communication network (it is obvious to one of ordinary skill in the art to operate Zangi et al's CDMA communication system in ultra wideband frequency, by doing so increase bandwidth and higher frequency diversity).

13. Claims 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zangi et al (US 6,778,619) in view of Applicant Admitted Prior Art (AAPA), and in further view of Ariyoshi et al (US 6,049,536).

Regarding claims 42 and 43, Zangi et al disclose a wireless communication receiver as described above. AAPA discloses a receiver comprises a band select filter, an amplifier, and an equalizer containing circuitry to combine an output to produce an output signal (335 in Fig. 3). Zangi et al and AAPA is silent about a despreader in the receiver.

However, Ariyoshi et al disclose a CDMA receiver comprises a despreader (603,604 in Fig. 5) having inputs coupled to a first and a second matched filter (601 in Fig. 5). The output of the matched filter derives as a correlation value and enables despread processing for fast acquisition (Col 8, L41-43). Applicant's invention is used in ultra-wideband communication system (UWB) (title; [0004]). Applicant also states that the despreader is maybe needed for communication system such as CDMA ([0047, L9-14]). Since applicant did not specifically described UWB to CDMA system conversion, it is assumed such conversion is well known and easy to achieve. Therefore, it is obvious to one of ordinary skill in art to implement the despreading

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process taught by Ariyoshi et al at the output of the first and second matched filters of Zangi et al. By doing so, achieve faster acquisition in a communication receiver system.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eva Y Puente whose telephone number is 571-272-3049. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Examiner, Art Unit 2611

October 19, 2008

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Supervisory Patent Examiner, Art Unit 2611